229

UNIVERSITY SCHOOL
OF
INFORMATION AND COMMUNICATION TECHNOLOGY

Department of Electronics and Communication Engineering

COURSE STRUCTURE

Course: B.Tech (Electronics and Communication Engineering)

Specialization: VLSI Design & Embedded Systems

BATCH: 2025-29

GAUTAM BUDDHA UNIVERSITY

GAUTAM BUDH NAGAR, GREATER NOIDA, UP, INDIA

220

CONTENTS

		Page No.
1.	Program Structure	3.
2.	Generic Electives from other Departments/Schools	7.
3.	Core Courses from Department of ECE/USICT (C)	8.
4.	Electives from Department of ECE (E)	9.
5.	Open Electives (OE)	11.
6.	Skill Enhancement Courses (SE)	12.
7.	Value Added Courses according to NEP2020 (VA)	13.
8.	Ability Enhancement Courses according to UGC/AICTE (AE)	14.
9.	Category-wise Credit Distribution	15.

227

1. Program Structure

I[st] Year

Semester-I

S.No.	Course Code	Course Name	Teaching Scheme			Credits	Types
			L	T	P		
1.		*Generic elective-1*	3	1	0	4	GE-1
2.		*Generic elective-2*	3	1	0	4	GE-2
3.		*Generic elective-3*	3	1	0	4	GE-3
4.	EV101	Fundamental of Computer Programming	2	0	0	2	C/SEC-1
5.	EV171	Computer Programming Lab	0	0	2	1	SEC-L1
6.	EG171	Basic Electrical Engineering Lab	0	0	2	1	GE-L1
7.	EP171	Physics Lab	0	0	2	1	GE-L2
8.		*Ability Enhancement Course-1*	2	0	0	2	AEC-1
9.		*Value Added Course-1*	1	0	0	1	VAC-1
		Total Hours and Credits	**15**	**2**	**6**	**20**	

Semester-II

S.No.	Course Code	Course Name	Teaching Scheme			Credits	Types
			L	T	P		
1.		***Generic elective-4***	3	0	0	3	GE-4
2.	EV102	Digital Electronics	3	0	0	3	C1
3.	EV104	Python	3	0	0	3	C2
4.	EV106	Signal and Systems	3	0	0	3	C3
5.	EV172	Digital Electronics Lab	0	0	2	1	C-L1
6.	EV174	Python Lab	0	0	2	1	C-L2
7.	EG181	Basic Electronics Engineering Lab	0	0	2	1	GE-L4
8.		***Skill Enhancement Course-2***	2	0	0	2	SEC-2
9.		***Ability Enhancement Course-2***	2	0	0	2	AEC-2
10.		***Value Added Course-2***	1	0	0	1	VAC-2
		Total Hours and Credits	**17**	**0**	**6**	**20**	

226

IInd Year

Semester-III

S.No.	Course Code	Course Name	Teaching Scheme			Credits	Types
			L	T	P		
1.	EV201	Electronic Circuits	3	0	0	3	C4
2.	EV203	Microprocessors	3	0	0	3	C5
3.	EV205	Semiconductor Device Physics and Modeling	3	0	0	3	C6
4.	EV207	Electromagnetic Field and Waves	3	0	0	3	C7
5.		***Skill Enhancement Course-3***	2	0	0	2	SEC-3
6.	EV271	Electronic Circuits Lab	0	0	2	1	C-L4
7.	EV273	Microprocessors Lab	0	0	2	1	C-L5
8.	SE271	Artificial IntelligenceLab	0	0	2	1	SEC-L3
9.		***Ability Enhancement Course-3***	2	0	0	2	AEC-3
10.		***Value Added Course-3***	1	0	0	1	VAC-3
		Total Hours and Credits	**16**	**0**	**6**	**20**	

Semester-IV

S.No.	Course Code	Course Name	Teaching Scheme			Credits	Types
			L	T	P		
1.	EV202	Linear Integrated Circuits	3	0	0	3	C8
2.	EV204	Antenna and Wave Propagation	3	0	0	3	C9
3.	EV206	Introduction to HDL Programming	2	0	0	2	C10
4.	EV208	IC Fabrication Technology	3	0	0	3	C11
5.		**Elective-1**	3	0	0	3	E1
6.	EV272	Linear Integrated Circuit Lab	0	0	2	1	C-L6
7.	EV274	Antenna and Wave Propagation Lab	0	0	2	1	C-L7
8.	EV276	HDL Programming Lab	0	0	2	1	C-L8
9.		***Skill Enhancement Course-4***	2	0	0	2	SEC-4
10.		***Value Added Course-4***	1	0	0	1	VAC-4
		Total Hours and Credits	**18**	**0**	**6**	**20**	

IIIrd Year

Semester-V

S.No.	Course Code	Course Name	Teaching Scheme			Credits	Types
			L	T	P		
1.	EV301	DigitalIC Design	3	1	0	4	C12
2.	EV303	Embedded Systems	3	1	0	4	C13
3.		**Elective-2**	3	0	0	3	E2
4.		**Elective-3**	3	0	0	3	E3
5.		**Open Elective-1**	3	0	0	3	OE-1
6.	EV371	Digital IC Design Lab	0	0	2	1	C-L9
7.	EV373	Embedded Systems Lab	0	0	2	1	C-L10
8.		***Value Added Course-5***	1	0	0	1	VAC-5
		Total Hours and Credits	**16**	**2**	**4**	**20**	

Semester-VI

S.No.	Course Code	Course Name	Teaching Scheme			Credits	Types
			L	T	P		
1.	EV302	AnalogIC Design	3	1	0	4	C14
2.	EV304	VLSI Testing and Verification	3	0	0	3	C15
3.		**Elective-4**	3	0	0	3	E4
4.		**Elective-5**	3	0	0	3	E5
5.		**Open Elective-2**	3	0	0	3	OE-2
6.	EV372	Analog IC Design Lab	0	0	2	1	C-L11
7.	EV374	VLSI Testing and Verification Lab	0	0	2	1	C-L12
8.		***Value Added Course-6***	2	0	0	2	VAC-6
		Total Hours and Credits	**17**	**1**	**4**	**20**	

224

IVth Year

Semester-VII

S.No.	Course Code	Course Name	Teaching Scheme			Credits	Types
			L	T	P		
1.	EV401	Mixed Signal VLSI Design	3	0	0	3	C16
2.	EV403	Mobile Stack Development	3	0	0	3	C17
3.		**Elective-6**	3	0	0	3	E6
4.		**Elective-7**	3	0	0	3	E7
5.		Open **Electives-3/MOOCs**	3	0	0	3	OE-3
6.	EV471	Mixed Signal Design Lab	0	0	2	1	C-L13
7.	EV473	Mobile Stack DevelopmentLab	0	0	2	1	C-L14
8.	EV491	Minor Project	0	0	6	3	MP1
		Total Hours and Credits	**12**	**0**	**16**	**20**	

Semester-VIII

S.No.	Course Code	Course Name	Teaching Scheme			Credits	Types
			L	T	P		
1.		***Ability Enahancement-4***	0	0	4	2	AEC-4
2.	EV492	Major Project	0	0	20	10	MP2
3.	EV494	Internship	0	0	10	5	I
4.	EV496	Research	0	0	6	3	R
		Total Hours and Credits	**0**	**0**	**40**	**20**	

Total Hours 160

GE	Generic electives from other Departments/Schools
OE	Open electives from other Departments/Schools
SEC	Skill Enhancement Courses
AEC	Ability Enhancement Courses
VAC	Values added courses according to NEP
GE-L	Generic Electives Lab from related discipline of other Departments/Schools
C	Core Courses from ECE/USICT
E	Electives from Department of ECE
S	Seminar
I	Internship
MP	Minor/Major Project

223

2. *Generic Electivesfrom other Departments/Schools*

Electives	Course Code	Course Name	Teaching Scheme			Credits
			L	T	P	
GE-1	EM101	Applied Mathematics	3	1	0	4
	EM103	Calculus and Linear Algebra	3	1	0	4
	EM105	Probability and Stochastic Process	3	1	0	4
	EM107	Linear Programming	3	1	0	4
	EM109	Discrete Mathematics	3	1	0	4
	EM111	Graph Theory	3	1	0	4
GE-2	EP101	Engineering Physics	3	1	0	4
	EP103	Semiconductor Physics	3	1	0	4
	EP105	Mechanics	3	1	0	4
	EP107	Solid-state Physics	3	1	0	4
	EP109	Electromagnetic Theory	3	1	0	4
	EP111	Waves and Optics	3	1	0	4
GE-3	EG101	Basic Electrical Circuit Analysis	3	1	0	4
	EG102	Engineering Graphics and Design	3	1	0	4
GE-4	EG104	Basic Electronics Engineering	3	1	0	4
	EG106	Computer Organization and Architectures	3	1	0	4
	EG108	Materials Science and Engineering	3	1	0	4

222

3. *Core Coursesfrom ECE/USICT*

Types	Course Code	Course Name	Teaching Scheme			Credits
			L	T	P	
C1	EV102	Digital Electronics	3	0	0	3
C2	EV104	Python for VLSI	3	0	0	3
C3	EV106	Signal and Systems	3	0	0	3
C4	EV201	Electronic Circuits	3	0	0	3
C5	EV203	Microprocessors and Microcontrollers	3	0	0	3
C6	EV205	Semiconductor Device Physics and Modeling	3	0	0	3
C7	EV207	Electromagnetic Field and Waves	3	0	0	3
C8	EV202	Linear Integrated Circuits	3	0	0	3
C9	EV204	Antenna and Wave Propagation	3	0	0	3
C10	EV206	Introduction to HDL Programming	2	0	0	2
C11	EV208	IC Fabrication Technology	3	0	0	3
C12	EV301	Digital IC Design	3	1	0	4
C13	EV303	Embedded Systems	3	1	0	4
C14	EV302	Analog IC Design	3	1	0	4
C15	EV304	VLSI Testing and Verification	3	0	0	3
C16	EV401	Mixed Signal VLSI Design	3	0	0	3
C17	EV403	Embedded Control Systems	3	0	0	3

221

4. *Electives from DECE*

Electives	Course Code	Course Name	Teaching Scheme			Credits
			L	T	P	
E1	EV210	Communication Engineering	3	0	0	3
	EV212	5G Communications	3	0	0	3
	EV214	Radar Engineering	3	0	0	3
	EV216	Optical Fiber Communication	3	0	0	3
E2	EV305	VLSI Computer Architectures	3	0	0	3
	EV307	VLSI DSP Architectures	3	0	0	3
	EV309	FPGA Architectures	3	0	0	3
	EV311	Semiconductor Materials and Device Characterisations	3	0	0	3
	EV313	Nano Science & Technology	3	0	0	3
	EV315	RF Microelectronics	3	0	0	3
	EV317	PCB Design and Manufacturing	3	0	0	3
E3	EV319	Digital Signal Processing	3	0	0	3
	EV321	Adaptive Signal Processing	3	0	0	3
	EV323	Audio and Speech Processing	3	0	0	3
	EV325	Image and Video Processing	3	0	0	3
	EV327	Statistical Signal Processing	3	0	0	3
E4	EV306	Introduction to MEMS	3	0	0	3
	EV308	Introduction to NEMS	3	0	0	3
	EV310	Semiconductor Optoelectronics	3	0	0	3
	EV312	Measurement and Instrumentation	3	0	0	3
	EV316	Biomedical Electronics	3	0	0	3
	EV318	Robotics and Automation	3	0	0	3
E5	EV320	ARM Development	3	0	0	3
	EV322	ARM SystemDevelopment	3	0	0	3
	EV324	Device Driver and Communication Protocols	3	0	0	3
	EV326	Linux Driver Development	3	0	0	3
	EV328	Introduction to Hybrid EV	3	0	0	3
	EV330	USB Device Driver	3	0	0	3
	EV332	Design of Device Driver Programming	3	0	0	3
E6	EV405	Low power VLSI	3	0	0	3
	EV407	Fundamentals of RF ICs	3	0	0	3
	EV409	Semiconductor Packaging and Testing	3	0	0	3
	EV411	Memory Design and Testing	3	0	0	3
	EV413	VLSI Physical Design Automation	3	0	0	3
	EV415	Hardware Software Co-design	3	0	0	3

220

E7	EV417	Internet of Things	3	0	0	3
	EV419	Digital Image Processing	3	0	0	3
	EV421	Smart Home Network	3	0	0	3
	EV423	Real Time Embedded Systems	3	0	0	3
	EV425	Reconfigurable Hardware Design	3	0	0	3
	EV427	Electric Vehicles	3	0	0	3
	EV429	Communication Networks and Security	3	0	0	3
	EV431	Machine Learning	3	0	0	3
	EV433	Human-machineInterface	3	0	0	3
	EV435	ASIC System Design	3	0	0	3

5. Open Electives

Electives	Course Code	Course Name	Teaching Scheme			Credits
			L	T	P	
OE-1	OE329	Machine Learning	3	0	0	3
	OE331	Big Data Analysis	3	0	0	3
	OE333	Cloud Computing	3	0	0	3
	OE335	Modern Wireless Communication Systems	3	0	0	3
	OE337	Bioinformatics	3	0	0	3
OE-2	OE334	Cryptography and Network Security	3	0	0	3
	OE336	Hardware/Software Co-design	3	0	0	3
	OE338	Nanoelectronics	3	0	0	3
	OE340	Wireless Sensor Networks	3	0	0	3
	OE342	Industrial automation	3	0	0	3
	OE344	Deep Learning	3	0	0	3
	OE346	Hardware Security	3	0	0	3
OE-3	OE433	Neuromorphic Computing	3	0	0	3
	OE435	Edge Computing	3	0	0	3
	OE437	Internet of Things (IoT) Security	3	0	0	3
	OE439	Wearable Computing	3	0	0	3
	OE441	Introduction to Biosensors	3	0	0	3

6. *Skill Enhancement Courses*

Electives	Course Code	Course Name	Teaching Scheme			Credits
			L	T	P	
SEC-1	SE101	Data Structures using C	2	0	0	2
	SE103	Entrepreneurship	2	0	0	2
	SE105	Cyber defense	2	0	0	2
	SE107	Information Technology	2	0	0	2
	SE109	Digital Education	2	0	0	2
SEC-2	SE102	Data Science	2	0	0	2
	SE104	Food Science & Technology	2	0	0	2
	SE106	Biofertilizers & Organic Farming	2	0	0	2
	SE110	Mushroom Culture & Technology	2	0	0	2
	SE112	Sustainable Development	2	0	0	2
	SE114	Introduction to Cyber Security	2	0	0	2
SEC-3	SE201	Introduction to AI	2	0	0	2
	SE203	Geoinformatics	2	0	0	2
	SE205	Financial Literacy	2	0	0	2
	SE207	Stock Market Operations	2	0	0	2
	SE209	Guidance and Counselling	2	0	0	2
	SE211	Disaster Management	2	0	0	2
	SE213	Management Information Systems	2	0	0	2
SEC-4	SE202	Digital Marketing	2	0	0	2
	SE204	Food processing and Bakery	2	0	0	2
	SE206	Personality Development	2	0	0	2
	SE208	Measurement and Instrumentation	2	0	0	2
	SE210	Robotics and Automation	2	0	0	2
	SE212	Smart Home Network	2	0	0	2
	SE214	Gem Testing	2	0	0	2
	SE216	Enterprise Resource Planning	2	0	0	2

7. Value Added Courses

Electives	Course Code	Course Name	Teaching Scheme			Credits
			L	T	P	
VAC-1	VA101	Constitution of India	1	0	0	1
	VA103	General Aptitude	1	0	0	1
	VA105	Verbal Reasoning	1	0	0	1
VAC-2	VA102	Environmental Science	1	0	0	1
	VA104	History of Science and Technology	1	0	0	1
	VA106	Employability Skills and Practices	1	0	0	1
VAC-3	VA201	Physical and Mental Health using Yoga	1	0	0	1
	VA203	Professional Skills and Practices	1	0	0	1
	VA205	Bharat Scout and Guide	1	0	0	1
VAC-4	VA202	Bhartiya Knowledge System	1	0	0	1
	VA204	Indian Art Form	1	0	0	1
	VA206	Bharat Geography	1	0	0	1
VAC-5	VA301	Professional Ethics	1	0	0	1
	VA303	Critical and Creative Thinking Skills	1	0	0	1
	VA305	Analytical and Logical Thinking Skills	1	0	0	1
VAC-6	VA302	Universal Human Values	1	0	0	1
	VA304	National Service Scheme	1	0	0	1
	VA306	National Cadet Corps	1	0	0	1
	VA308	National Sports Organization	1	0	0	1

216

8. *Ability Enhancement Courses*

Electives	Course Code	Course Name	Teaching Scheme			Credits
			L	T	P	
AEC-1	AE101	English Proficiency	2	0	0	2
	AE103	English Communication Skills	2	0	0	2
	AE105	German Proficiency	2	0	0	2
	AE107	Chinese Proficiency	2	0	0	2
AEC-2	AE102	Technical Writing Skills	2	0	0	2
	AE104	Academic Writing Skills	2	0	0	2
	AE106	Business Writing and Correspondence	2	0	0	2
	AE108	Cross-Cultural Communication	2	0	0	2
	AE110	Organisational Behavior	2	0	0	2
AEC-3	AE201	Design Thinking and Methodology	2	0	0	2
	AE203	Decision-Making Skills	2	0	0	2
	AE205	Leadership Development	2	0	0	2
	AE207	Networking and Relationship Building	2	0	0	2
AEC-4	AE402	Seminar	0	0	4	2
	AE404	Presentationand Public Speaking	0	0	4	2
	AE406	Interview Skills and Techniques	0	0	4	2

9. Category-wise Credit distribution

S.No.	Category	Credits
1.	Generic Electives	18
2.	Core Courses	68
3.	Electives	21
4.	Open Electives	09
5.	Skill Enhancement Courses	09
6.	Ability Enhancement Courses	08
7.	Value Added Courses	06
8.	Projects	13
9.	Internship	05
10.	Research	03
	Total Credits	160